

Introduction to the High School Transcript Study (HSTS)

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This module introduces users to the National Assessment of Educational Progress (NAEP) High School Transcript Study (HSTS). This module provides users with basic information about the study's design; target population and sample design; and data collection, sources, and methods. It will also provide a broad overview of the topics for which data are available for analysis to help you answer the fundamental question... "Are HSTS data for me?" This module will also demonstrate how to use the NAEP Data Explorer (NDE) for HSTS data analysis.

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NAEP coordinates a number of related special studies. Such studies often involve special data collection procedures in the field, secondary analyses of NAEP results, and evaluations of various technical procedures. The HSTS is one of the NAEP special studies. Through the HSTS, the National Center for Education Statistics (NCES), periodically surveys the curricula being followed in our nation's high schools and the coursetaking patterns of high school students through a collection of transcripts. HSTS provides information about the types of courses that 12th graders take, how many credits they earn, and their grade point averages. Conducted in conjunction with NAEP, HSTS also offers information on the relationship of student coursetaking patterns to achievement at grade 12 as measured by NAEP. With the most recently reported 2009 study, HSTS provides over a decade of valuable findings to the education community.

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The NAEP HSTS is conducted with a nationally representative sample of students and high schools. Beginning in the summer and continuing through the fall of the year, high school transcripts are collected for students who graduated from public and private high schools that were sampled for the NAEP assessments in 12th grade. The sample of schools is nationally representative of all schools in the United States, and the sample of students is representative of graduating seniors from each school. As most of the students sampled in the transcript study are in schools that participated in NAEP, it is possible to link coursetaking patterns to academic performance, as measured by NAEP.

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In general, the following materials are collected from the participating schools: a transcript for each student selected to participate in NAEP that provides course information (such as, courses taken, grades earned, course types, and credits earned), as well as general student background information (i.e., gender, race/ethnicity, type of diploma earned, and grade point average); a School Information Form that provides general information about class periods, credits, graduation requirements, and other aspects of school policy; and a course catalog (or if a catalog is not available, a list of courses) offered for each of four consecutive years, for example, from 2005-2006

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through 2008-2009. In some cases, transcripts are collected for students whose schools did not participate in NAEP. NAEP School Questionnaires are completed by a school official to provide information about school, teacher, and home factors that might relate to student achievement.

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High school courses across the country vary by content and level even when the course titles are similar. The HSTS uses a system called the Classification of Secondary School Courses, or CSSC, to compare the thousands of transcripts collected from different schools included in the HSTS, and to ensure that each course is uniquely identified. This system now includes more than 2,200 course codes.

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HSTS identifies three types of courses: core academic courses, which includes English, mathematics, science and social studies; other academic courses, which includes fine arts, foreign languages and computer-related studies; and other courses, which includes vocational education, personal health, and physical education. To standardize the reporting of coursetaking, NCES uses the Carnegie definition of a credit—120 hours of classroom instruction. HSTS reports on the average course credits earned, as well as grade point average.

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A common measure of academic achievement for high school students is the grade point average, or GPA. Calculating GPA requires both grade information and course credit information.

Since credit and grade information reported on transcripts vary considerably among schools, districts and states, it is necessary to standardize this information so that valid student- and school-level comparisons can be made. In HSTS studies, standardized credit information is based on the Carnegie unit, which is defined as a course with 120 hours of instruction.

Grade information on transcripts varies even more widely than credit information. Grades are reported as letters, numbers, or other symbols on a variety of scales. Numeric grades are converted to standardized grades as shown here unless the school documents specify other letter grade equivalents for numeric grades. The most common GPA scale is the four-point grade scale. In this scale, the letter grade 'A' equals four points, the letter grade 'B' equals three points, the letter grade 'C' equals two points, the letter grade 'D' equals one point, and the letter grade 'F' equals zero points. The High School Transcript Study (HSTS) uses this four-point grade scale to standardize each student's GPA.

The GPA represents the average number of grade points a student earns for each graded high school course. Courses in which a student does not receive a grade, such as pass/fail and audited courses, do not factor into the GPA calculation. More

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information regarding GPA calculation can be accessed by clicking the corresponding underlined screen text.

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The data collected from HSTS are typically reported in three ways. First they are reported as a distribution of graduates by coursetaking and demographic characteristics. They are also reported by the mean number of credits (in Carnegie units) that graduates earn in major subject fields and by student demographic categories. Finally, they are reported by the relationship of NAEP scores with various graduate characteristics.

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The 2009 HSTS generated a nationally representative sample of 37,600 high school graduates and their transcripts from 740 public and private schools. The transcripts were collected from June 2009 through January 2010.

Transcripts were collected from seniors who graduated in 1987, 1990, 1994, 1998, 2000, and 2005, facilitating analysis of trends in coursetaking over time. NAEP-related transcript studies were also conducted in previous years.

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HSTS examines coursetaking patterns in two ways, by looking at curriculum level and Science, Technology, Engineering, and Mathematics (STEM) coursetaking. Student curricula are classified as either standard (which is the least demanding), midlevel, or rigorous. STEM coursetaking is classified as either advanced mathematics, advanced science and engineering, or technical.

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The first perspective on coursetaking is curriculum level, which considers how many academic credits a graduate takes during high school. Curriculum levels are a measure of high school graduates' overall academic achievement. They can help measure how well graduates are prepared for postsecondary education, based on the number and type of academic courses taken.

Students taking a standard curriculum have earned four credits in English and three credits in each of the three remaining core subjects (social studies, mathematics, and science). Students taking a midlevel curriculum have earned the standard four credits in English and three credits in each of the three remaining core subjects, but have also earned one foreign language credit and completed more challenging mathematics and science courses (including either geometry and/or algebra I or II; and at least two credits in either biology, chemistry, and/or physics). Students taking a rigorous curriculum have earned the midlevel credits, but have also earned three foreign language credits and completed four more challenging mathematics credits (including pre-calculus or higher). Any curriculum that does not meet the requirements for the standard level is considered below standard.

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HSTS also considers STEM coursetaking, classifying certain high school courses as either STEM advanced mathematics, STEM advanced science and engineering, or STEM-related technical. Here the courses are classified by their STEM coursetaking designation. Algebra II, trigonometry, statistics, pre-calculus, and calculus courses are classified as STEM advanced mathematics. Advanced biology, chemistry, advanced environmental/earth science, physics, and engineering courses are classified as STEM advanced science and engineering. Engineering/Science technology, health/science technology, and computer science courses are designated as STEM-related technical.

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The HSTS NAEP Data Explorer (NDE) provides data such as coursetaking and grade point average for students who graduated high school in 1990, 2000, 2005, and 2009. For 2005 and 2009 graduates, these data are also linked to NAEP grade 12 mathematics and science results.

On the next few slides, we'll demonstrate how the HSTS NDE can be used to explore HSTS data. In addition to the materials presented within this module, a tutorial and quick reference guide are available from the NDE homepage. Additionally, analysts can use the NDE help button, which is available at the top of every page within the NDE.

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To begin, navigate to the HSTS NDE by clicking the corresponding underlined screen text. Agree to the terms detailed within the pop up window to enter the HSTS NDE.

The first step in exploring HSTS data is to select criteria from each drop-down menu, subject and a grade. In the example shown here, we have selected **mathematics** and **Grade 12**.

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Once the subject and grade are selected additional option menus open, like the one you see here. You can select a measure from the **Category** section of the NDE; the example selected here is **NAEP Mathematics Composite scale** but you can also select (or deselect) any of the other options that appear. From the **Group** section of the NDE the **National** jurisdiction has been pre-selected. Once you have selected all your analysis criteria, click **2. Select Variables** to advance to the next screen.

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From the **Select Variables** tab, you will see HSTS NDE variables for analysis nested within Categories and Sub Categories. It is important to note that the first Category and Sub Category – Major Reporting Groups, Student Factors – will be expanded. A scroll bar to the right of the HSTS NDE window will allow you to scroll down to additional Categories of interest. You can also click the purple downward facing arrows to the left of each Category and Sub Category to collapse the lists for easier navigation.

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Here you can see the Transcript Information Category has been expanded to show the seven Sub Categories available for additional exploration.

The screens that follow will show HSTS NDE results for two variables: students' mathematics GPA and mathematics SAT score. These variables were added to our analysis by clicking **Transcript Information** under Category, then clicking **GPA** under Sub Category, then selecting **GPA Mathematics**. Then under the Category Other student assessments, clicking **SAT mathematics score**.

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Clicking **3. Edit Reports** at the bottom of the Select Variables tab will bring you to the Edit Reports tab. From this page you will be able to preview, edit, delete, or copy the reports specified in the previous steps. Here we see the reports that will be generated for each of our selected variables, GPA – Mathematics and SAT Mathematics Score, as well as a cross-tabulated report to explore both variables simultaneously.

Next, click **4. Build Reports** at the bottom of the NDE page.

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From the **Build Reports** tab, you will be able to view the results from each specified report by selecting the report name from the **Select Report** drop-down menu. The default display of results is tabular. If you'd like to generate a chart, click **Chart**. If you'd like to run a significance test, click **Significance Test**. To export the reports, click **Export Reports**.

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Here we see the results of a significance test generated within the HSTS NDE. Students with a GPA between 2.50 and 2.99 score 17 points higher than those with a GPA between 0.00-2.49. In the table to view this particular test, look at the cell at the intersection of the 3rd row and the 2nd column. The greater than sign indicates that the students with a GPA between 2.50 and 2.99 scored higher. 'Diff=17' indicates that the score difference between the two groups of students is 17 NAEP points and the p-value for this t-test is 0.0000.

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From the **Build Reports** tab, you can select **Report 2** to view one of the other reports specified. Again, the default display of results is tabular.

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Here we see the results of another significance test generated within the HSTS NDE. Students with a Mathematics SAT score between 501 and 600 score 47 points higher than those with an SAT score less than or equal to 400. In the table to view this particular test, look at the cell at the intersection of the 4th row and the 2nd column. The greater than sign indicates that the students with a Mathematics SAT score between

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501 and 600 scored higher. 'Diff=47' indicates that the score difference between the two groups of students is 47 NAEP points and the p-value for this t-test is 0.0000.

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Finally, by returning to the **Build Reports** tab, you can select **Report 3** to view the last report specified. Again, the default display of the cross-tabulation of GPA and Mathematics SAT score is tabular. A chart or significance test can be generated by clicking the appropriate tab within the NDE.

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This module has provided you with an introduction to the NAEP High School Transcript Study (HSTS) and described the study's design, target population and sample design, and data collection years, sources, and methods. Additionally, this module has highlighted topics for which data are available for analysis. It has also demonstrated how to use the NDE with HSTS data.

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Important resources that have been provided throughout the module are summarized in this slide along with the module's objectives for your reference. You may now proceed to the next module in the series, or click the **Exit** button to return to the landing page.